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(54) **A device for tipping a refuse container into the body of a refuse-collection vehicle**

Vorrichtung zum Entleeren eines Müllbehälters in den Sammelbehälter eines Müllfahrzeuges

Dispositif pour vider un récipient à ordures dans la benne d'un véhicule de ramassage d'ordures

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Description

[0001] The present invention concerns a device for tipping a refuse container over the body of a refuse-collection vehicle, comprising:

a guide structure associated to a side wall of the vehicle in such a way as to be swingable between a position substantially parallel to the wall and a position inclined thereto;

a carriage which can move along the guide structure between a lowered position and a raised position following the actuation of first actuator means associated to the guide structure and to the carriage; and

pick-up means for picking up the container comprising a pair of arms which can rotate simultaneously relative to the carriage about an axis transverse the guide structure following the actuation of second actuator means for controlling the rotation of the arms between a position in which they engage the container and a raised position in which the container is above the position of engagement.

[0002] A device of the type indicated above is known from US-A-4 872 801 or from IT-B-1 262 500, in which the guide structure is articulated directly at its upper end to a side of the refuse-collection vehicle. A hydraulic cylinder is also articulated close to the lower part of this side and, by its extension, is intended to control the inclination of the guide structure with respect to the side of the vehicle. However, in order to enable containers also far from the vehicle to be picked up, the device must be provided with very long pick-up arms so that they can compensate, by their length, for the large inclination of the guide structure needed in these conditions. Naturally, such long arms considerably increase the weight bearing on the carriage which supports the arms directly so that it is necessary to increase the size of the actuators which control the movement of the carriage. In addition, the length of the arms, particularly when they have engaged the container, gives rise to large moments of force due to the distance between the load which is cantilevered from the carriage and the axis of rotation of the arms such that the entire device must have a relatively complex structure in order to withstand them.

[0003] The primary object of the present invention is to propose a device of the aforesaid type which allows refuse containers to be picked up whether they are close to or far from the vehicle, but which has shorter arms so as not to be subject to the disadvantages mentioned above with respect to the prior art.

[0004] This object is achieved by virtue of the fact that a swingable member is interposed between the guide structure and the vehicle, being articulated to the vehicle and to the guide structure, and by the fact that the lower part of guide structure is also articulated to a support

rod which is slidable relative to the vehicle in such a way that it can project in a direction substantially transverse the said wall of the vehicle.

[0005] The device which is the subject of the present invention is therefore particularly simple and light in comparison with similar known devices, the resulting decreased production costs and reliability in use being particularly advantageous. Its structure also enables the time taken for each cycle of engaging, tipping and repositioning of the refuse containers to be reduced considerably. In addition, it is possible to use pick-up arms of a restricted length so as to allow refuse containers situated very close to the vehicle to be engaged as well as containers located relatively far away from it.

[0006] The prior-art device described above is also provided with a movable carriage which supports an auxiliary structure which can be tipped relative thereto and to which the pick-up arms are directly connected. In particular, when the carriage reaches the raised position close to the upper end of the guide structure, the auxiliary structure of the carriage must be turned upside down relative to the carriage itself to pour the contents of the container into the vehicle body. Naturally the carriage provided with this tippable auxiliary structure is complex in that it requires actuators for controlling the movement of the auxiliary structure, and is therefore expensive to produce.

[0007] A further object of the present invention is to provide a device of the type indicated above in which the carriage is of extremely simple construction.

[0008] This further object is achieved by virtue of the fact that the said second actuator means enable the arms to be moved between a rest position which is lower than the position of engagement of the container and a position of tipping of the container angularly spaced from the raised position of the container in the opposite sense from the engagement position.

[0009] In this way, the second actuator means alone can move the arms between all of their operative positions without needing moving carriage parts to contribute to the movement of the arms.

[0010] The second actuator means preferably include an actuator of the helical type.

[0011] Further characteristics and advantages of the present invention will become clearer from the following detailed description, made with reference to the accompanying drawings and given purely by way of non-limitative example, in which:

Figure 1 is a side elevational view of a refuse-collection vehicle including a tipping device according to the invention;

Figure 2 is a front elevational view of the device according to the invention;

Figure 3 is a side elevational view taken in the direction of the arrow III in Figure 2, which illustrates the positions that the device according to the invention can assume in use in a full line and a broken

line respectively;

Figure 4 is a sectional view on an enlarged scale of a detail indicated by the arrow IV in Figure 2;

Figure 5 shows half of a transverse section taken on the line V-V of Figure 4, the half not shown being symmetrical to that which is illustrated;

Figure 6 is a similar view to that of Figure 5 and shows half of a transverse section taken on the line VI-VI of Figure 4;

Figure 7 is a transverse section taken on the line VII-VII of Figure 4;

Figures 8 and 9 are similar views which show, on an enlarged scale, a detail indicated by the arrow VIII in Figure 3 in two different operative positions; and

Figures 10 and 11 are rear elevational views of a refuse-collection vehicle provided with the device according to the invention during the steps of handling a refuse container in which the container is close to or far from the vehicle respectively.

[0012] With reference initially to Figures 1 to 9, reference numeral 1 indicates a refuse-collection vehicle having a body 2 into which are tipped the contents of refuse containers C which are handled by a device 3 attached to a side wall 2a of the vehicle 1.

[0013] Although reference is made in the present description to a side of the vehicle 1, such as the side wall to which the device 3 is attached, the device could also be attached to a different wall of the vehicle 1, for example a rear wall or even a front wall.

[0014] The device 3 includes a guide structure 5 comprising a pair of uprights 7 with upper ends 7a and lower ends 7b, each of which can, for example, be made from a channel shaped profiled section. A carriage 9 is movable along the uprights 7 and preferably has two pairs of rollers (not shown in the drawings), each of which engages one of the uprights 7.

[0015] One end of each of a pair of chains 11 is fixed to the carriage 9, the opposite ends being anchored to the guide structure 5. A hydraulic cylinder 13 connected to the structure 5 supports a pair of idle wheels 13a, in known way, over which the chains 11 pass in such a way that, on extension of the cylinder 13, the chains 11 cause the carriage 9 to move along the guide structure 5 between a lowered position and a lifted position with respect to the structure.

[0016] In a position on the uprights 7 intermediate the ends 7a and 7b but closer to the end 7b, a support rod 15 is articulated to the structure 5 at 7c by means of a pair of lugs 15a. The rod 15, which is advantageously made from a square-profiled piece, is slidable in a guide piece fixed to the vehicle body 1 and having a section corresponding to that of the rod 15, with the interposition of slide members (not visible in the drawings) interposed in such a way that the rod and the profiled guide piece are held together by a prismatic coupling. The sliding of the rod 15 along the guide element is driven by an ac-

tuator, for example of the linear fluid type (not visible in the drawings).

[0017] Each end 7a of the uprights 7 is articulated to one end 18a of a swingable member 18 whose opposite end 18b is articulated on the vehicle 1, for example on elongate elements 20 fixed to the side wall 2a of the vehicle 1. This swingable member 18 can be made from a plurality of bars extending parallel to the guide structure 5 and rigidly attached to a sheet 19 of, for example, corrugated metal.

[0018] The carriage 9 provides rigid support for the body 27 of a hydraulic actuator 23 intended to control the simultaneous rotation of a pair of pick-up arms 25 about an axis of the actuator 23 disposed transverse the direction of movement of the carriage 9 and, therefore, the guide structure 5.

[0019] In particular, the actuator 23 enables the arms 25 to pivot between a lowered rest position, in which they are substantially parallel to the guide structure 5 (see Figure 2 and the part drawn in continuous line in Figure 3), a container-engagement, or pick-up position, in which the arms 25 assume a substantially horizontal position (see the broken line part of Figure 3, and Figures 8, 10 and 11), a position in which the container C is lifted which is slightly higher than the pick-up position (see Figures 9, 10 and 11) and a position in which the container C is tipped over the body 2 of the vehicle 1, in which the arms are angularly spaced from the container-lifting position in the opposite sense from the engagement position (Figures 8 and 9).

[0020] The actuator 23 therefore allows the arms 25 to pivot through approximately 270° from the extreme lowered rest position to the opposite extreme position in which the container C is tipped over.

[0021] In particular the actuator 23, which is, to advantage, of the double-acting helical type, comprises an annular chamber 29 within a cylindrical body 27 in which an annular piston 31 is slidable. The piston 31 preferably has three helical grooves 33 in its radially outer surface, each of which is engaged by a helical projecting slide member 35 mounted on a pivot pin fixed to the body 27.

[0022] A pair of ducts 38 allow pressurised fluid to be supplied to the opposite ends of the chamber 29 in order to drive the sliding of the piston 31 within the chamber 29.

[0023] The piston 31 also has a plurality of axial grooves 43a in its radially inner surface, preferably three, each of which is engaged by a respective projection 43 of corresponding shape which extends radially from a central portion 28 within the actuator 23, which is also positioned within the piston 31 and free to rotate with it relative to the body 27.

[0024] Coaxially, within the annular piston 31 there is a pair of aligned cylindrical bodies 37 each of which forms one of the external walls of a pair of cylindrical chambers 39 of a pair of associated double-acting, linear hydraulic actuators 41, as well as portions of the internal wall of the chamber 29, both of these bodies 37

being fixed by axially opposite ends to the central portion 28. These actuators 41 are therefore aligned with each other and are coaxial with the axis of the actuator 23.

[0025] Each actuator 41 includes a respective piston 47 which can slide in the associated chamber 39 and which is attached rigidly to an associated arm 25 of the device 3 by means of a hollow shaft 49.

[0026] Pressurised fluid is supplied through a pair of ducts 44, 45 respectively to the opposite ends of each chamber 39 of the actuators 41, the duct 44 being formed in the central portion 28 and communicating at one end with a duct outside the actuator 23 by means of holes passing through the piston 31 and, at the other end, with both of the chambers 39.

[0027] An axially-splined guide rod 51 is slidable axially in the hollow shafts 49. This rod 51 engages in specific central holes having a shape corresponding to both of the pistons 47, and its central part is fixed to the central portion 28. In this way the pistons 47 are fixed firmly for rotation about the axis of the actuator 23 with the arms 25. By controlling the actuators 41, it is possible to vary the mutual spacing of the pick-up arms 25 telescopically in such a way as to adapt the device 3 as necessary for handling containers C of different sizes.

[0028] The arms 25, illustrated in greater detail in Figures 8 and 9, each include a pick-up end 26 which has a heel-like support portion 28 extending from its lower part for bearing against a vertical abutment rib 28a of the container C when the container C is lifted by the arms 25.

[0029] The upper part of the end 26 of each arm 25 has a pair of oppositely inclined surfaces 30 which converge towards a seat 32 intended to house a cylindrical appendage 32a projecting laterally from the rib 28a of the container C.

[0030] A bar 34 is articulated on each of the arms 25 close to the seat 32, the bar having an associated fluid actuator 36 for driving its pivotal movement between an inactive rest position (Figure 10) and an active position (Figure 11) in which the bar 34 retains one of the appendages 32a in the associated seat 32. When the bar 34 moves from its inactive rest position to its active position, it engages part of the pivoted cover 40 of the container C so as to open it.

[0031] During operation of the device, and with reference particularly to Figures 10 and 11, the vehicle 1 is located alongside a refuse container C to be tipped over its body 2. The vehicle 1 will, to advantage, have known sensor devices for indicating its correct positioning with respect to the container C, for example of the telecamera, photocell or sonic type.

[0032] The vehicle 1 can be close to the container C as illustrated in Figure 10, or further away from it as in Figure 11. The support rod 15 will however be caused to move transverse the vehicle 1 so as to bring the lower end of the guide structure 5 close to the container C to be handled.

[0033] By virtue of the device which is the subject of

the present invention, refuse containers C located at distances which may vary between approximately 0.3 m and 2.7 m from the vehicle 1 can be handled efficiently.

[0034] The carriage 9 is driven to move from a rest position, which is generally an intermediate position with respect to the guide structure 5, in which the arms 25 are also in a rest position adjacent the wall 2a and appropriate for the phases in which the vehicle 1 moves (see the position of the arms 25 illustrated by the solid line in Figure 3), to a position close to the lower end 7b of the uprights 7. The arms 25 then assume a substantially horizontal position (illustrated by the broken line in Figure 3 and with the reference numeral 25a in Figures 10 and 11) as a result of a first rotation about the axis of the actuator 23 until the cylindrical projections 32a of the container C engage the inclined surfaces 30 of the ends 26 of the arms 25. A slight further rotation of the arms 25 causes the projections 32a to slide along the surfaces 30 until they engage in their respective seats 32. In this position the arms pick up the container C and start to lift it.

[0035] The carriage 9 is then caused to move from its lowered position to its raised position relative to the guide structure 5 as a result of the actuation of the cylinder 13 and, simultaneously, the arms 25 are rotated further so as to reach the raised position indicated by the reference numeral 25b in Figures 10 and 11.

[0036] When the arms 25 move from the container-engagement position to the raised position the actuators 36 are controlled in such a way as to cause the bars 34 to rotate simultaneously so as to retain the projections 32a in the seats 32 and open the cover 40 of the container C.

[0037] When the carriage 9 reaches the raised position at the upper ends 7a of the uprights 7, the actuator 23 causes the arms 25 to rotate further to the position indicated by the reference numeral 25c which corresponds to the position in which the container C is tipped over the body 2 of the vehicle 1. The container C is therefore emptied, after which it is returned to its initial position on the ground by reversal of the sequence movements used to lift and tip over the container.

Claims

1. A device for tipping a refuse container over the body (2) of a refuse-collection vehicle (1) comprising:
 - a guide structure (5) associated to a side wall (2a) of the vehicle (1) in such a way to be swingable between a position substantially parallel to the wall (2a) and a position inclined thereto;
 - a carriage (9) which can move along the guide structure (5) between a lowered position and a raised position following the actuation of first actuator means (13) associated to the guide structure (5) and to the carriage (9); and

- pick-up means (25) for picking up the container (C) comprising a pair of arms (25) which can rotate simultaneously relative to the carriage (9) about an axis transverse the guide structure (5) following the actuation of second actuator means (23) for controlling the rotation of the arms (25) between a position in which they engage the container (C) and a raised position in which the container (C) is above the position of engagement, characterised in that a swingable member (18) is interposed between the guide structure (5) and the vehicle (1), being articulated to the vehicle (1) and to the guide structure (5), and in that the lower part of the guide structure (5) is also articulated to a support rod (15) which is slidable relative to the vehicle (1) in such a way that it can project in a direction substantially transverse the said wall (2a) of the vehicle (1). 5 10 15
- 2. A device according to Claim 1, characterised in that the said second actuator means (23) enable the arms (25) to be moved between a rest position which is lower than the position of engagement of the container (C) and a position of tipping of the container (C) which is angularly spaced from the raised position of the container in the opposite sense from the engagement position. 20 25
- 3. A device according to Claim 2, characterised in that the said second actuator means (23) comprise an actuator of the helical type. 30
- 4. A device according to Claim 3, characterised in that the helical actuator (23) includes an annular piston (31) slidable in a correspondingly shaped chamber (29), the radially outer surface of the annular piston (31) having at least one helical groove (33) engaged by an associated projecting slide member (35) fixed to the body (27) of the helical actuator (23), the radially inner surface of the annular piston (31) having at least one axial groove (43a) engaged by a projection (43) fixed to the arms (25) and free to rotate with the annular piston (31) relative to the body (27) of the helical actuator (23). 35 40 45
- 5. A device according to Claim 4, characterised in that the said helical actuator (23) has at least one associated linear actuator (41) for varying the mutual spacing of the arms (25). 50
- 6. A device according to Claim 5, characterised in that the helical actuator (23) includes a pair of separate, axially-aligned cylindrical chambers (39) within the annular piston (31), an associated piston (47) connected to a respective arm (25) being slidable in each of the cylindrical chambers (39). 55
- 7. A device according to Claim 6, characterised in that each of the pistons (47) slidable in the cylindrical chambers (39) engages a splined guide rod (51) whereby the pistons (47) are fixed for rotation therewith. 5
- 8. A device according to any one of Claims 1 to 7, characterised in that the arms (25) have a pick-up end (26) with a support heel (28) for bearing against a shoulder (28a) of the container (C), and lead-in means including a pair of opposing inclined surfaces (30) which converge towards a seat (32) for housing a respective cylindrical appendage (32a) projecting from a side of the container (C).
- 9. A device according to Claim 8, characterised in that each arm (25) has a bar (34) articulated thereto and movable between an inactive rest position and an active position in which it retains the appendage (32a) of the container (C) in the respective seat (32), the bar (34) also being able to open a pivoting cover (40) of the container (C) in its movement between the inactive position and the active position.
- 10. A device according to any one of Claims 1 to 7, characterised in that the first actuator means include a hydraulic cylinder (13) associated with rotatable reversing means (13a) over which pass flexible transmission means having opposite ends anchored to the carriage (9) and to the guide structure (5) respectively. 20 25 30

Patentansprüche

1. Vorrichtung zum Kippen eines Müllbehälters über den Körper (2) eines Müllabfuhrfahrzeuges (1) umfassend:
 - eine Führungskonstruktion (5), welche einer Seitenwand (2a) des Fahrzeuges (1) so zugeordnet ist, daß sie zwischen einer zur Wand (2a) im wesentlichen parallelen Stellung und einer zu dieser geneigten Stellung schwenkbar ist;
 - einen Wagen (9), welcher entlang der Führungskonstruktion (5) durch Betätigung von ersten, der Führungskonstruktion (5) und dem Wagen (9) zugeordneten Stellmitteln (13) zwischen einer unteren und einer oberen Stellung bewegbar ist; und
 - Greifmittel (25) zum Aufnehmen des Behälters (C), umfassend ein Paar Arme (25), welche durch Betätigung von zweiten Stellmitteln (23) zur Steuerung der Drehung der Arme (25) zwischen einer Stellung, in welcher sie am Behäl-

- ter (C) angreifen, und einer oberen Stellung, in welcher sich der Behälter (C) oberhalb der Aufnahmestellung befindet, gleichzeitig relativ zum Wagen (9) um eine zur Führungskonstruktion (5) querverlaufende Achse drehbar sind, dadurch gekennzeichnet, daß ein schwenkbarer Teil (18) zwischen der Führungskonstruktion (5) und dem Fahrzeug (1) angeordnet und am Fahrzeug (1) und an der Führungskonstruktion (5) gelenkig angebracht ist, und daß der untere Teil der Führungskonstruktion (5) ebenfalls gelenkig mit einer Tragstange (15) verbunden ist, welche zum Fahrzeug (1) so verschiebbar ist, daß sie in eine zur Seitenwand (2a) des Fahrzeugs (1) im wesentlichen quer verlaufenden Richtung vorstehen kann.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die zweiten Stellmittel (23) die Bewegung der Arme (25) zwischen einer Ruhestellung, welche unter der Aufnahmestellung des Behälters (C) liegt, und einer Kippstellung des Behälters (C) ermöglichen, welche winkelmäßig von der oberen Stellung des Behälters in die der Aufnahmestellung entgegengesetzte Richtung verschieden ist.
3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die zweiten Stellmittel (23) ein helikales Stellglied umfassen.
4. Vorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß das helikale Stellglied (23) einen in einer entsprechend geformten Kammer (29) verschiebbaren, ringförmigen Kolben (31) aufweist, wobei die radial äußere Fläche des ringförmigen Kolbens (31) zumindest eine schraubenförmige Nut (33) hat, in welche ein zugehöriger vorstehender Schieberteil (35) eingreift, der am Körper (27) des helikalen Stellgliedes (23) befestigt ist, und wobei die radial innere Fläche des ringförmigen Kolbens (31) mindestens eine axiale Nut (43a) hat, in welche ein Vorsprung (43) eingreift, der an den Armen (25) fixiert ist und mit dem ringförmigen Kolben (31) gegenüber dem Körper (27) des helikalen Stellgliedes (23) frei drehbar ist.
5. Vorrichtung nach Anspruch 4, dadurch gekennzeichnet, daß das helikale Stellglied (23) zumindest ein zugehöriges lineares Stellglied (41) zur Veränderung des Abstandes der Arme (25) zueinander aufweist.
6. Vorrichtung nach Anspruch 5, dadurch gekennzeichnet, daß das helikale Stellglied (23) ein Paar getrennte, axial fluchtende zylindrische Kammern (39) innerhalb des ringförmigen Kolbens (31) aufweist, wobei ein zugehöriger mit dem entsprechenden Arm (25) verbundener Kolben (47) in jeder der zylindrischen Kammern (39) verschiebbar ist.
7. Vorrichtung nach Anspruch 6, dadurch gekennzeichnet, daß jeder in den zylindrischen Kammern (39) verschiebbare Kolben (47) mit einer Führungskeilwelle (51) in Eingriff steht, wobei die Kolben (47) mit dieser drehbar fixiert sind.
8. Vorrichtung nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die Arme (25) ein Greifende (26) mit einem gegen eine Schulter (28a) des Behälters (C) drückbaren Tragabsatz (28) und Einfuhrmittel aufweisen, die ein Paar entgegengesetzt geneigte Flächen (30) aufweisen, welche zum Sitz (32) hin konvergieren, der für die Aufnahme eines entsprechenden von einer Seite des Behälters (C) vorstehenden zylindrischen Fortsatzes (32a) bestimmt ist.
9. Vorrichtung nach Anspruch 8, dadurch gekennzeichnet, daß jeder Arm (25) eine Stange (34) aufweist, die daran gelenkig befestigt ist und zwischen einer inaktiven Ruhestellung und einer aktiven Stellung, in welcher sie den Fortsatz (32a) des Behälters (C) im entsprechenden Sitz (32) zurückhält, bewegbar ist, wobei die Stange (34) auch die Fähigkeit hat, einen Schwenkdeckel (40) des Behälters (C) bei ihrer Bewegung zwischen der inaktiven Stellung und der aktiven Stellung zu öffnen.
10. Vorrichtung nach einem der Ansprüche 1 bis 7, dadurch gekennzeichnet, daß die ersten Stellmittel einen hydraulischen Zylinder (13) umfassen, welche drehbaren Umkehrmitteln (13a) zugeordnet sind, über die flexible Übertragungsmittel laufen, deren gegenüberliegende Enden mit dem Wagen (9) bzw. mit der Führungskonstruktion (5) verankert sind.
- ## Revendications
1. Un dispositif pour vider un conteneur à ordures sur le corps (2) d'un véhicule de collecte d'ordures (1), comprenant:
- une structure de guidage (5) associée à une paroi latérale (2a) du véhicule (1) d'une manière à être susceptible de basculer entre une position sensiblement parallèle à la paroi (2a) et une position inclinée par rapport à celle-ci;
 - un châssis (9) pouvant se déplacer le long de la structure de guidage (5), entre une position abaissée et une position levée, à la suite de l'actionnement de premiers moyens actionneurs (13) prévus sur la structure de guidage (5) et sur le châssis (9); et

- des moyens de prélèvement (25) pour saisir le conteneur (C) comprenant une paire de bras (25) pouvant tourner simultanément par rapport au châssis (9) autour d'un axe transversal à la structure de guidage (5), à la suite de l'actionnement des deuxièmes moyens actionneurs (23), pour commander la rotation des bras (25), entre une position, dans laquelle ils viennent en prise avec le conteneur (C), et une position levée, dans laquelle le conteneur (C) est au-dessus de la position de mise en prise, caractérisé en ce qu'un organe (18) susceptible de basculer est interposé entre la structure de guidage (5) et le véhicule (1), étant articulé au véhicule (1) et à la structure de guidage (5), et en ce que la partie inférieure de la structure de guidage (5) est également articulée à une tige support (15) susceptible de coulisser par rapport au véhicule (1), de manière à pouvoir faire saillie dans une direction sensiblement transversale à ladite paroi (2a) du véhicule (1). 5
- 2. Un dispositif selon la revendication 1, caractérisé en ce que lesdits deuxièmes moyens actionneurs (23) permettent aux bras (25) d'être déplacés entre une position de repos, inférieure à la position de mise en prise du conteneur (C), et une position de renversement du conteneur (C), espacée angulairement de la position levée du conteneur, dans le sens opposé vis-à-vis de la position de mise en prise. 10
- 3. Un dispositif selon la revendication 2, caractérisé en ce que lesdits deuxièmes moyens actionneurs (23) comprennent un actionneur de type hélicoïdal. 15
- 4. Un dispositif selon la revendication 3, caractérisé en ce que l'actionneur hélicoïdal (23) comprend un piston annulaire (31) pouvant coulisser dans une chambre (29) à configuration correspondante, la surface radialement extérieure du piston annulaire (31) ayant au moins une gorge hélicoïdale (33) dans laquelle un organe coulissant (35) en saillie, associé, vient en prise, en étant fixé au corps (27) de l'actionneur hélicoïdal (23), la surface radialement intérieure du piston annulaire (31) ayant au moins une gorge axiale (43a), dans laquelle une saillie (43), fixée aux bras (25), vient en prise et est libre de tourner avec le piston annulaire (31) par rapport au corps (27) de l'actionneur hélicoïdal (23). 20
- 5. Un dispositif selon la revendication 4, caractérisé en ce que l'actionneur hélicoïdal (23) a au moins un actionneur linéaire (41) associé pour faire varier l'espacement mutuel des bras (25). 25
- 6. Un dispositif selon la revendication 5, caractérisé en ce que l'actionneur hélicoïdal (23) comprend une 30
- 7. Un dispositif selon la revendication 6, caractérisé en ce que chacun des pistons (47) susceptibles de coulisser dans les chambres cylindriques (39) vient en prise avec une tige de guidage (51) cannelée, de manière que les pistons (47) soient assujettis en rotation à celle-ci. 35
- 8. Un dispositif selon l'une quelconque des revendications 1 à 7, caractérisé en ce que les bras (25) ont une extrémité de saisie (26) avec une queue support (28), destinée à porter contre un épaulement (28a) du conteneur (C), et des moyens d'insertion incluant une paire de surfaces (30) d'inclinaison opposées, convergeant vers un siège (32) pour loger un appendice cylindrique (32a) respectif faisant saillie depuis un côté du conteneur (C). 40
- 9. Un dispositif selon la revendication 8, caractérisé en ce que chaque bras (25) a une barre (34) lui étant articulée et déplaçable entre une position de repos inactive et une position active, dans laquelle elle retient l'appendice (32a) du conteneur (C) dans le siège (32) respectif, la barre (34) étant également en mesure d'ouvrir un couvercle pivotant (40) du conteneur (C), au cours de son déplacement effectué entre la position inactive et la position active. 45
- 10. Un dispositif selon l'une quelconque des revendications 1 à 7, caractérisé en ce que les premiers moyens actionneurs comprennent un cylindre hydraulique (13) associé à des moyens d'inversion rotatifs (13a), sur lesquels passent des moyens de transmission flexibles ayant des extrémités opposées ancrées au châssis (9) et à la structure de guidage (5), respectivement. 50

FIG. 1

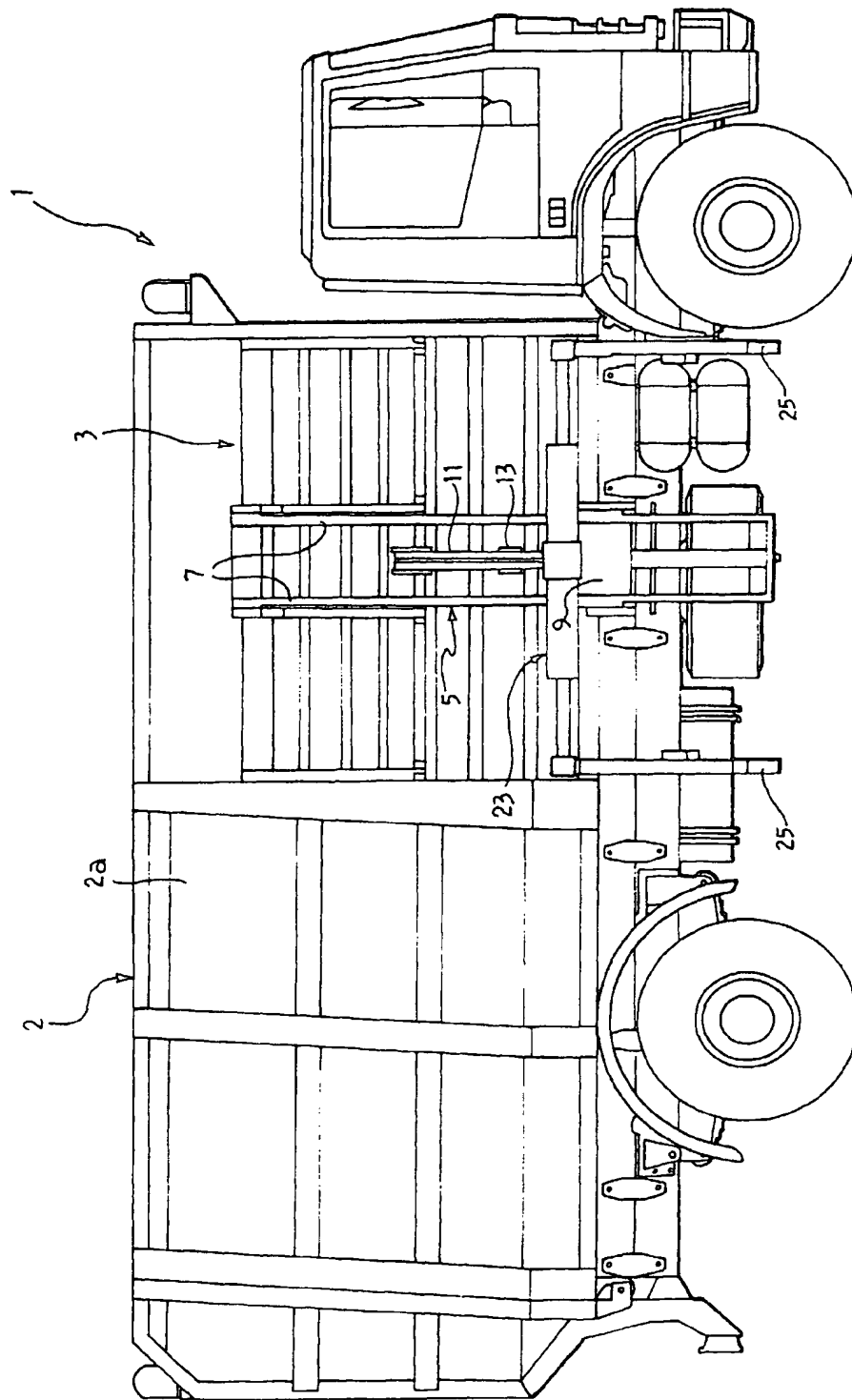


FIG. 2

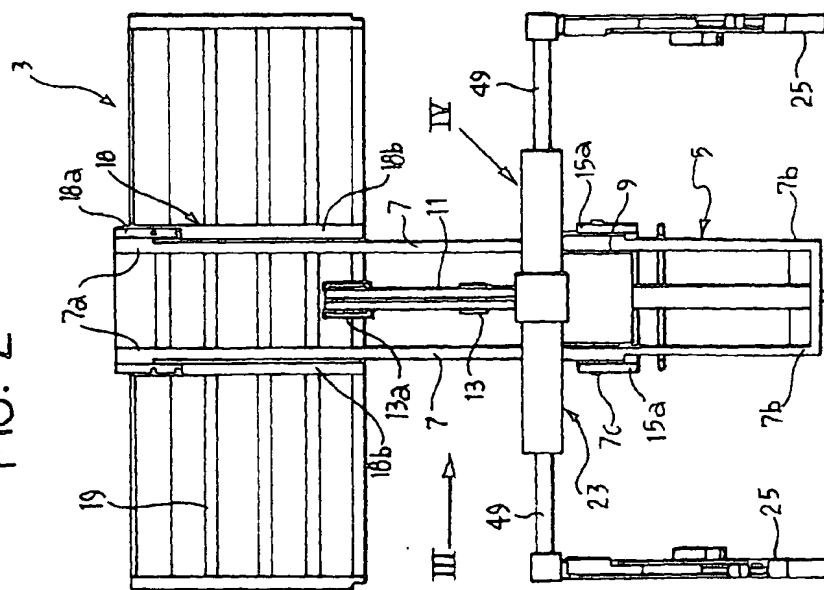
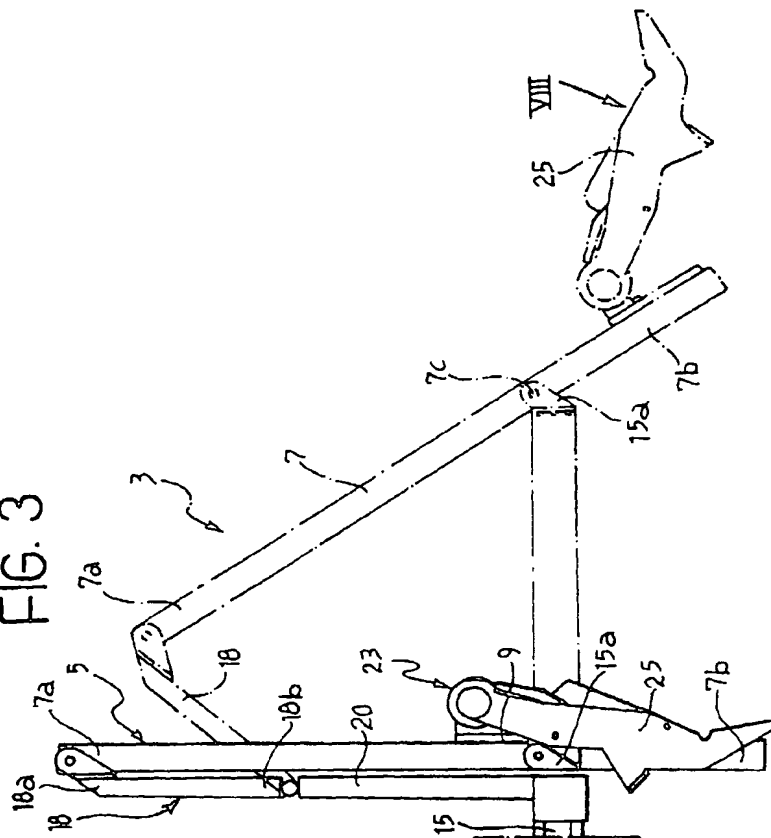


FIG. 3



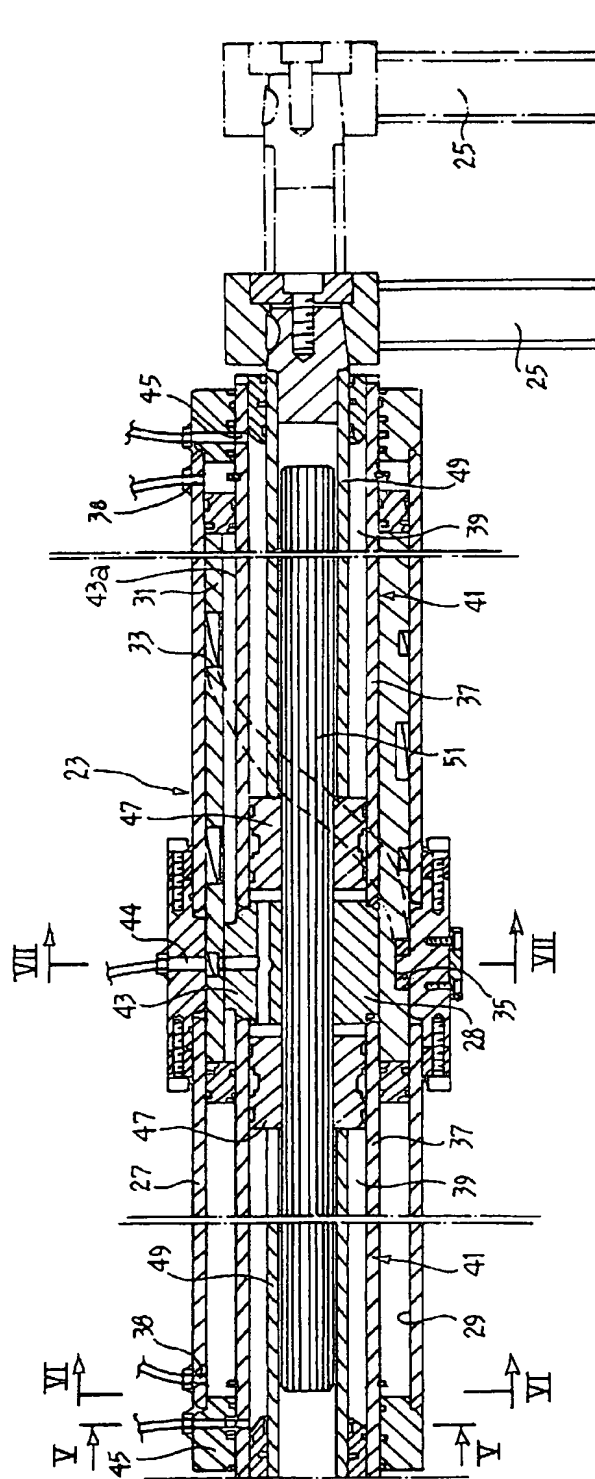


FIG. 4

FIG. 5

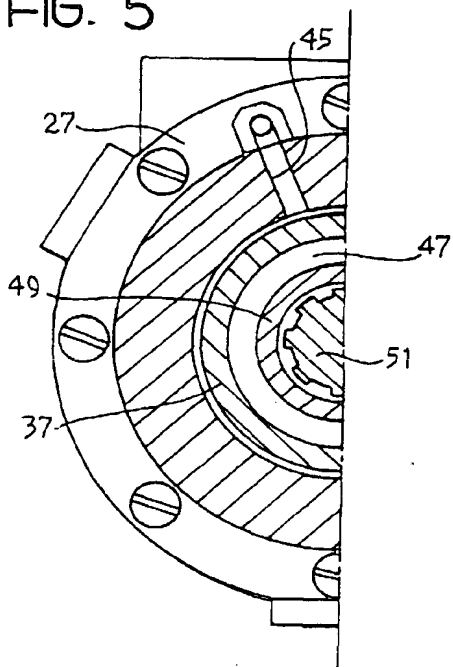


FIG. 6

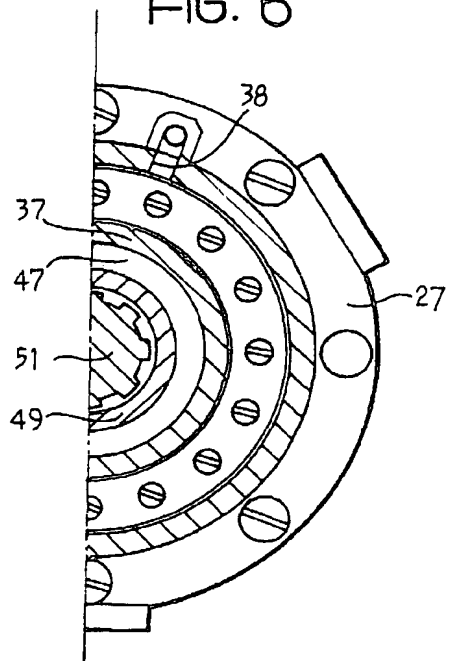


FIG. 7

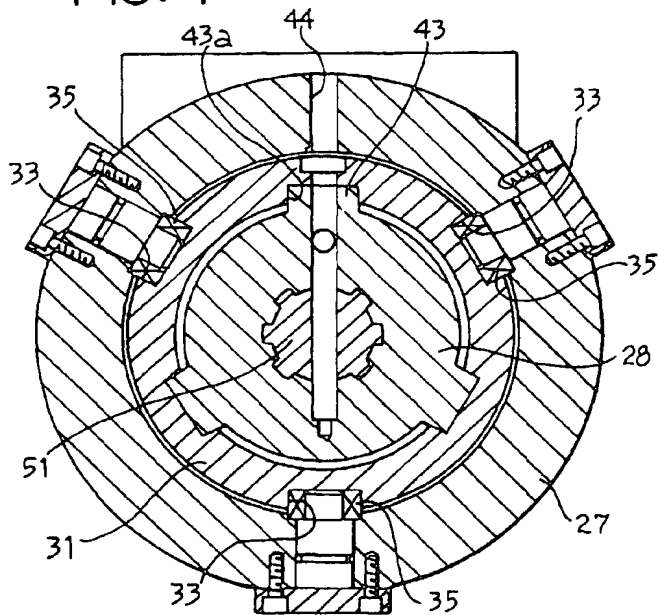


FIG. 8

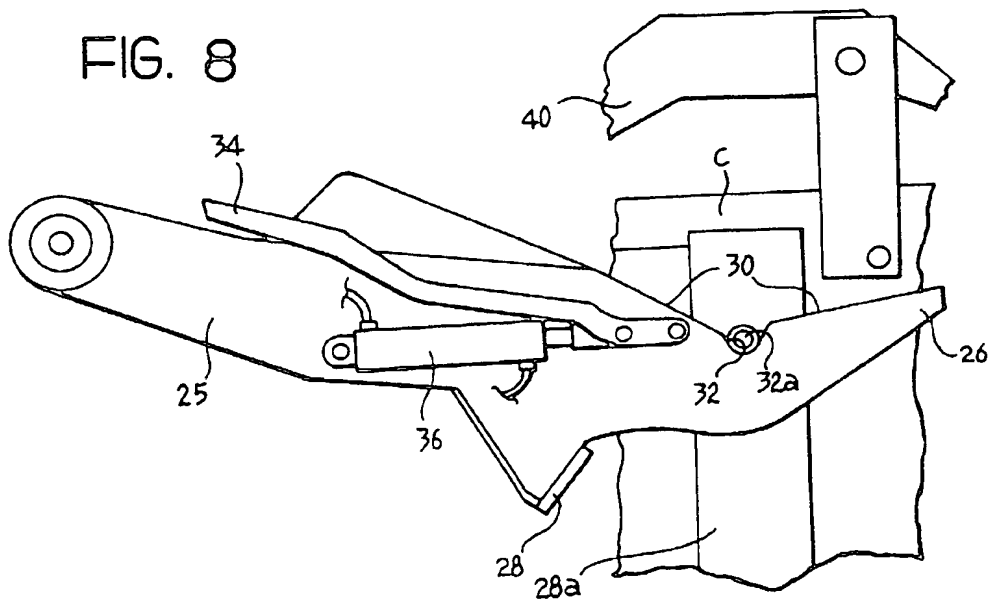


FIG. 9

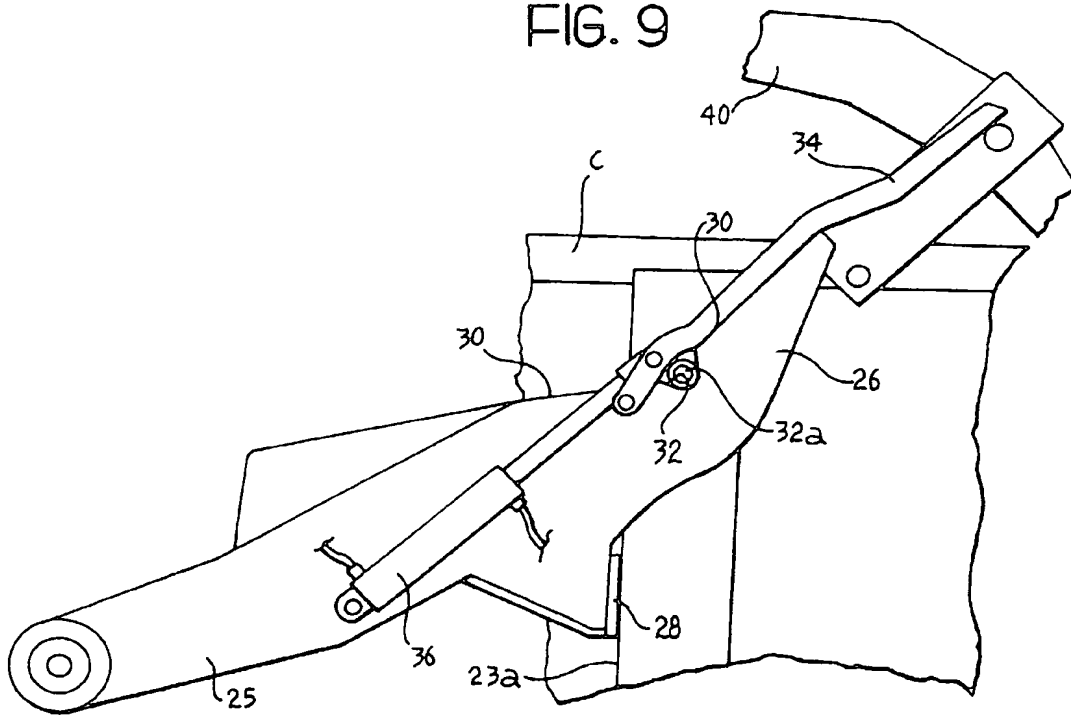


FIG. 10

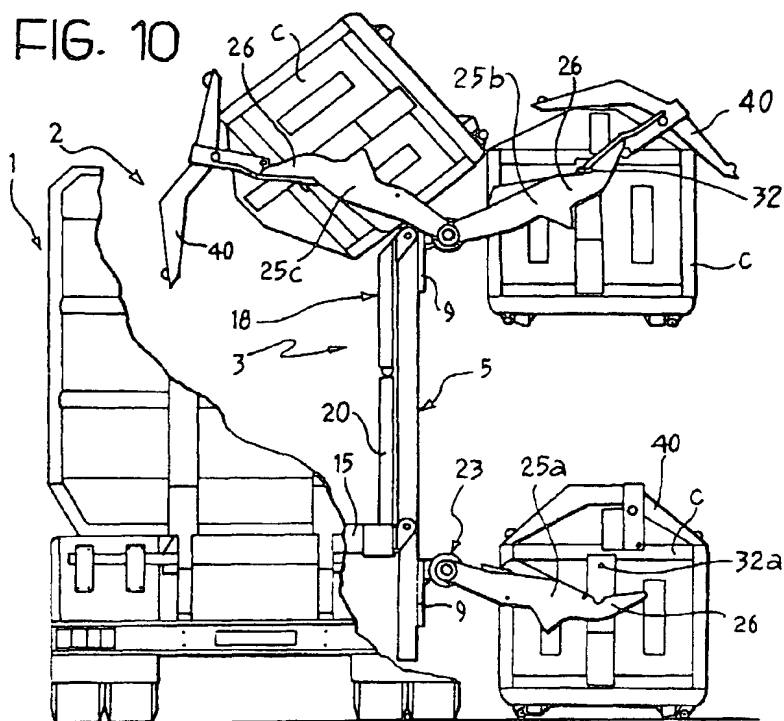
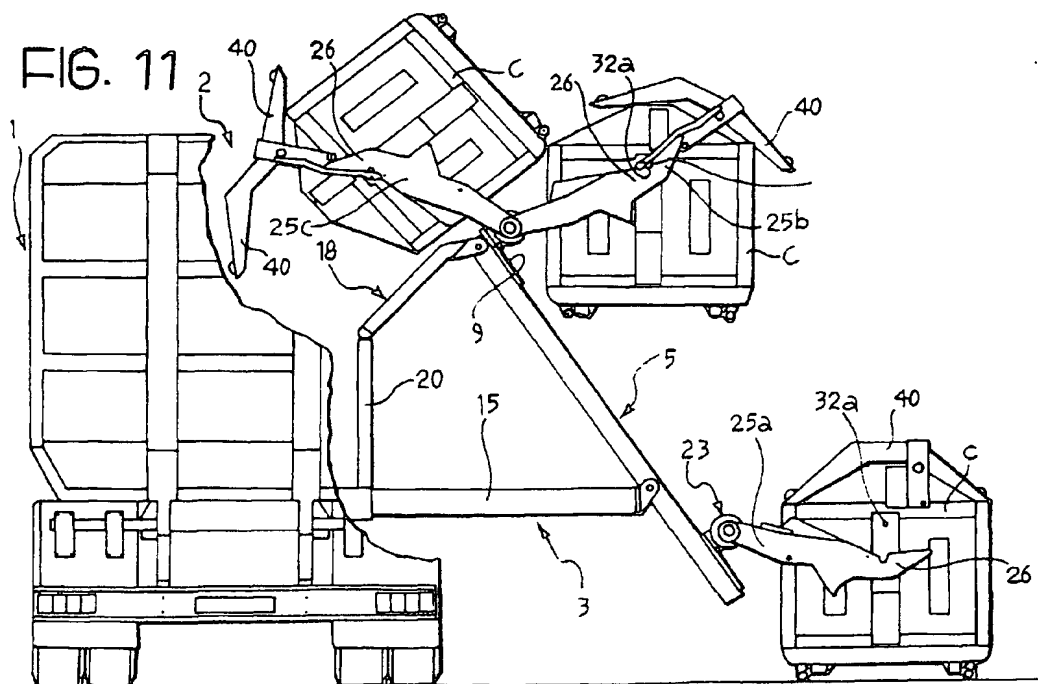


FIG. 11



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